

Work Order ID 85877

85877

Page 1

July-06-12 10:25:18 AM

Item ID: D212-664-107 Accept *N900040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Low Standard Fwd
 Start Date: 6/18/12 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 7/02/12 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: *N* Date: Tooling: Date: Run Start *NR1*
 QC: Date: SPC (Y/N): Date: Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D212-664-147	Rev B (DEO)								
100		0.00							
100	DOCUMENT CONTROL								
DC	Memo	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D212-664-107 D6019-128 (ID = 2.125") = CHG 002								
110		0.00							
110	Packaging								
Packaging	Memo	0.00							
Packaging									
120		0.00							
120	BENDING MACHINE - CROSSTUBES								
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D212-664-107 using CNC bender program 212-107								

DAS 16 2-83 12/08/02

MCJ 12/08/02

Rm 12-7-10

MO/Rm 12-7-10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 85877

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Item ID: D212-664-107

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Low Standard Fwd

Start Date: 6/18/12 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 7/02/12 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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130

QC15- Crosstube Dimensional Check

0.00

130

QC

Memo

0.00

Quality Control

140

0.00

140

Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***

2-Position cuffs on tube ensure proper positioning

3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10

4-Transfer drill rivet holes from cuff into tube.

5-Identify cuff position and Batch # on each and identify tube as per dwg D212-664-107.

6- *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***
Inspect surface damage

7- Deburr and realodine cuff.

JW

MO

12-7-10

12-7-11

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 *150* QC Quality Control	<u>QCS</u> <u>u</u> Memo	0.00 0.00		8126412					
160 *160* HandFXtube Hand Finishing Crosstubes	Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** 1- CLEAN CROSSTUBE WITH WASH'N WIPE	0.00 0.00							AB 12-7-20
180 *180* Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 17428 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order 17504	0.00 0.00							CZ 12/07/11 ① CZ 12/07/20 ①

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W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 6/18/12 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 7/02/12 **Req'd Qty:** 1.00 *** 1 ***

Customer:

Reference:

Run Start *NR1*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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190

0.00

190

Packaging

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

200

QC5- Inspect part completeness to step on W/O	0.00
---	------

0.00

200

Memo

0.00

QC

Quality Control

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE ***

Inspect for damage & ensure results are as per Dwg D212-664-107

202

0.00

202

Memo

0.00

HandFXtube

Hand Finishing Crosstubes

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

1- PRESSURE WASH AND THEN USE WASHH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION

Dart Aerospace Ltd

W/O: 8587A		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-107 PAR #: _____ Fault Category: Machining NCR: Yes No QA: [Signature] Date: 12/08/13
 Resolution: _____ Disposition: Rework QA: N/C Closed: [Signature] Date: 12/08/14

NCR: 12-1663		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.07.24	200	FROM MACHINING TRANSITION MARK VISIBLE. THIS MARK IS TYPICAL, HOWEVER IT IS USUALLY BUFFED OUT. LOCATED IN MIDDLE OF R35.5 BEND.	 12.7.24	THE MARK WAS SMOOTH AND BARELY VISIBLE. PERFORM ADDITIONAL BUFFING IN AFFECTED AREA. ENSURE THERE ARE NO CIRCUMFERENTIAL MARKS.	JW 12-08-02	 12/08/02	 12.7.24	 17/06/02
		↓	 12.7.24	RE-NDT AFTER BUFFING		 17/06/02	 12.7.24	 17/06/02

NOTE: Date & initial all entries

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 Required Date: 7/02/12 Req'd Qty: 1.00 ***1*** Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
205	QC7-Inspect Chemical Conversion Coat	0.00							
205									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
210	Crosstubes	0.00							
210									
Crosstubes	Memo	0.00							
Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff A/R SIKAFLEX -241/-291 BATCH: <u>122130</u>								
215	QC5- Inspect part completeness to step on W/O	0.00							
215									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								

DAS
16
8-53
7/13/24

A2 12-7-24

DAS
16
8-53
7/13/24

Dart Aerospace Ltd

W/O: 85877		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D712-664-102 PAR #: _____ Fault Category: Landing Gear / x-tube assembly NCR: Yes No DQA: AD Date: 12/08/13
 Resolution: _____ Disposition: Rework QA: N/C Closed: AD Date: 12/08/14

NCR: 12-11664		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12/07/30	#	Found before priming a small notch / nick in the tube. on the upper main Bend about 38.375" from cdy. R.C. miss handling of tubes.	MD 12/7/30	Accurate to buy out "nick" as per Email from DS. to Juh 30th 2012.	Rm 12-7-30		MD 12/7/30	DA 16 8-8 12/4/30
				Clean with acid & Re touch up grinding as per as 1005	Rm 12-7-30			DA 16 8-8 12/4/30

NOTE: Date & initial all entries

Eric Downing

From: David Shepherd <dshepherd@dartaero.com>
Sent: Monday, July 30, 2012 3:03 PM
To: 'Mike Petsche'; 'Eric Downing'; 'Alex Pharand'
Cc: 'L Lacelle'; psmith@dartaero.com; Isam el Kassis; 'Bill Beckett'
Subject: RE: nick on D212-664-107

Mike,

Thanks for the clearer photo.

Eric,

It is acceptable to buff out this damage on the basis that:

- a) It is within the allowable damage limits of our ICA
- b) It is for a low gear fwd crosstube
- c) Damage is outside supports and near the neutral axis

Since the alodine coating will be compromised, does this mean that we would etch and re-alodine the entire tube to have a continuous alodine coating.

Isam & Bill,

FYI.

David

From: Mike Petsche [<mailto:mpetsche@dartaero.com>]
Sent: July-30-12 9:00 AM
To: 'David Shepherd'; 'Eric Downing'; 'Alex Pharand'
Cc: 'L Lacelle'; psmith@dartaero.com
Subject: RE: nick on D212-664-107

It's about 17.5" (ish) off BL 0.

Better photo attached. You can see where it's raised on the RH side

From: David Shepherd [<mailto:dshepherd@dartaero.com>]
Sent: Monday, July 30, 2012 10:51 AM
To: 'Eric Downing'; 'Alex Pharand'
Cc: 'L Lacelle'; psmith@dartaero.com; 'Mike Petsche'
Subject: RE: nick on D212-664-107

How far is it from BL 0?

Can you send a better photo of the defect?

Thanks,
David

From: Eric Downing [<mailto:edowning@dartaero.com>]
Sent: July-30-12 5:36 AM
To: David Shepherd; Alex Pharand
Cc: 'L Lacelle'; psmith@dartaero.com; 'Mike Petsche'
Subject: nick on D212-664-107

Good morning David

As you can see from the time I just walked in to be told of a small "nick" in a C212-664-107 cross tube. The nick appears to be about 0.012" deep and about 0.065" in width. From looking at it I would guess that it was damaged when moving tubes to pain NDT inspection and alodine. The "nick" happened after the alodine process as you can see in the pictures attached.

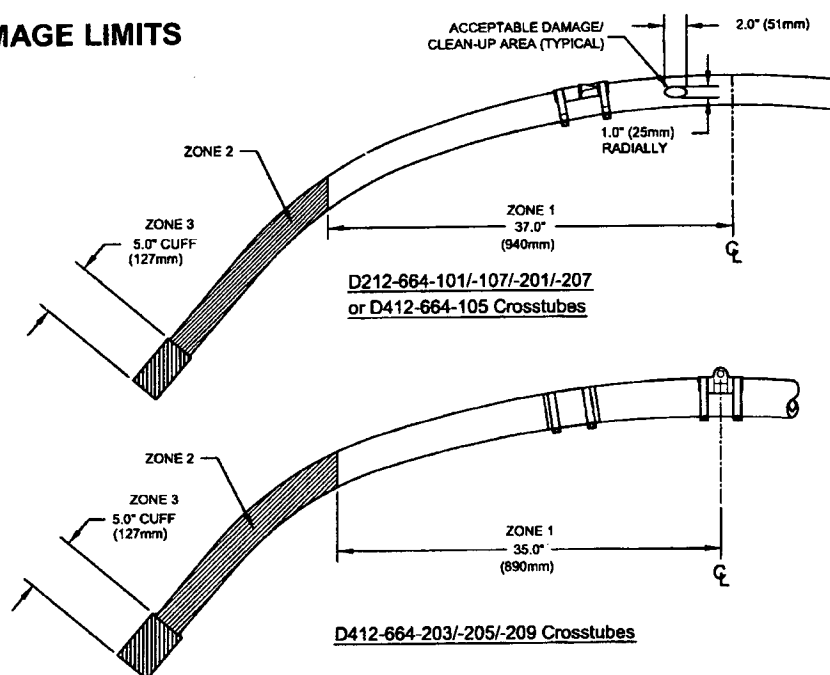
Now my questions are is it acceptable to buff this "nick" out ad for the alodine process how should we proceed? Can we buff out mark clean area with acid wash and apply alodine?

What do you think David I don't the ability to approve any reworks like this.

Thanks

Eric Downing
QC Corrdinator
Dart Aerospace LTD

5.2 DAMAGE LIMITS



Maximum Nick, Scratch, or Corrosion Damage Depth Limit			
Damage Zone	3	2	1
D212-664-101/-107 High/Std. Fwd Crosstube	0.030" (0.76mm)	0.012" (0.30mm)	0.015" (0.38mm)
D412-664-105 Low-Narrow Fwd Crosstube	0.030" (0.76mm)	0.015" (0.38mm)	0.015" (0.38mm)
D212-664-201/-207 High/Std. Aft Crosstube	0.038" (0.97mm)	0.015" (0.38mm)	0.015" (0.38mm)
D412-664-203/-209 High/Std. Aft Crosstube	0.038" (0.97mm)	0.012" (0.30mm)	0.015" (0.38mm)
D412-664-205 Low-Narrow Aft Crosstube	0.038" (0.97mm)	0.015" (0.38mm)	0.015" (0.38mm)

Figure 5-2: Acceptable Crosstube Damage Limits

5.3 300 HOUR INSPECTION

To be performed every 300 hours or if damage found on daily inspection.

Note: For the convenience of scheduling maintenance, the tolerance for scheduled inspection intervals is +/-10% (+/- 30 hours). In each case, the subsequent interval will be adjusted to re-establish the original schedule. When an inspection is done more than 10% early, subsequent inspections will be advanced as required not to exceed the maximum tolerance. Concurrence and final approval of inspection interval tolerance by the governing civil aviation authority is the responsibility of the owner/operator.

- 5.3.1 Inspect all visible areas of the crosstube for cracks. The bottom side of the crosstube should be inspected for cracks using a 10X magnifying glass with weight on the landing gear. If a pattern is observed that resembles the crack pattern shown in Figure 5-3 below, an LPI inspection should be performed as outlined in section 5.5. Cracks in the crosstube are

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Work Order ID 85877

85877

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July-06-12 10:25:18 AM

Item ID: D212-664-107

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Low Standard Fwd

Start Date: 6/18/12 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 7/02/12 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220		0.00							
220	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: <u>9:00</u>								
	Finish Time: <u>9:00</u>								
	PAINT:								
	Start Time: <u>1:00</u>								
	Finish Time: <u>2:00</u>								
230	QC14- Inspect Spray Paint	0.00							
230									
QC	Memo	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								

12.07.31

12.08.01

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Crosstubes								
Crosstubes	Memo	0.00							
Crosstubes	1- Assemble as per Dwg D212-664-147								
	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DSI9563 and QSI 015 A/R Proseal 890 Batch: <u>122441</u>								
	3- Torque bolts as per dwg								
250	QC5- Inspect part completeness to step on W/O	0.00							
250									
QC	Memo	0.00							
Quality Control									

(DAS
16
8-89 17/05/02

120801

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:

Reference:

Run Start *NR1*

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Stop ***NR2***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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255

Pick Kit

0.00

255

Packaging

Memo

0.00

Packaging

260

QC4- 100% Inspect kits for completeness

0.00

260

QC

Memo

0.00

Quality Control

270

0.00

270

Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-107

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Run Start *NR1*

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Stop *NR2*

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280

QC21- Final Inspection - Work Order Release

0.00

280

QC

Memo

0.00

Quality Control

W120802

MJ 12/08/02

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Page 1

Work Order ID: 85877

85877

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012

Required Date: 02/07/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D
 10.05.27 added pick kit DD verf:EC IPP Rev:E 11.10.17
 added SEQ 215 DD verf:EC IPP REV:F 11.11.03 as per
 chg003 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN		Manufactured	No		B 86053	140	Each	0.0000	1	(1)		RW 12-7-10	
D212-664-107TRN									**				
Crosstube Turning Detail													
D3659-1		Manufactured	No			220	Each	9.0000	2	2			
D3659-1									**				
CUFF													

Location	Loc Qty	Loc Code
ST482	9	
67005	1	
75173	1	
77032	7	
CR3212-4-06		
Purchased	No	
	240	Each
	202.0000	44
CR3212-4-06		**
CHERRY RIVET		

122378

Location	Loc Qty	Loc Code
ST330	149	
120521	149	
ST331	53	
112492	18	
112794	8	
119717	27	

(2) JW 12-7-10
 (44) AP 12-7-24

Dart Aerospace Ltd

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Page 2

Work Order ID: 85877

85877

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012

Required Date: 02/07/2012

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

240 Each

155.8095 4 4

D3595-063-450

RUBBER CUSHION

**

W 12.08.07

Location	Loc Qty	Loc Code
LG	36	
82511	36	
LG051	109.7	
80161	1.7	
84715	108	
MAT052	10.109474	
67353	2	
68893	6	
70113	0.56	
71354	0.2	
74113	0.349474	
75597	1	

MS21920-25

Purchased No

240 Each

107.0000 4 4

MS21920-25

Clamp(per MIL-DTL-8783C)

**

A 12-8-2

Location	Loc Qty	Loc Code
LG050	67	
116264	2	
117998	4	
118142	4	
119339	2	
119746	2	
120475	7	
120920	46	
LG051	40	
121583	40	

B# 122204

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Page 3

Work Order ID: 85877

85877

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012

Required Date: 02/07/2012

Start Qty: 1.00

Required Qty: 1.00

D2893-1 Manufactured No

240 Each

25.0000

2 2

D2893-1

2.75 Support

**

11/12 08 01

Location

Loc Qty

Loc Code

LG

9

83056

9

LG052

16

72865

2

80271

13

82228

1

87922

D3428-1 Manufactured No

260 Each

39.0000

**

D3428-1

Placard

Location

Loc Qty

Loc Code

ST042

39

78933

2

81881

15

83582

10

85228

12

AN6-35A Purchased No

260 Each

58.0000

**

AN6-35A

BOLT

Location

Loc Qty

Loc Code

342

50

121181

50

ST342

8

120187

8

1

4

1122416

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

June-18-12 10:46:08 AM

Work Order ID: 85877

85877

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 18/06/2012

Required Date: 02/07/2012

Start Qty: 1.00

Required Qty: 1.00

AN6-36A

Purchased

No

260

Each

68.0000

4

AN6-36A
Bolt

** [Redacted]

M122416 5f

Location

Loc Qty

Loc Code

ST342

68

118422

2

119449

1

120187

4

120423

61

MS210421-6

Purchased

No

260

Each

598.0000

6

MS210421 6
Nut

** [Redacted]

5f

Location

Loc Qty

Loc Code

ST300

598

117677

25

118384

3

118927

48

119075

322

120308

200

AN960JD616

NAS1149D0663J

Purchased

No

260

Each

0.0000

18

AN960JD616
Washer

** [Redacted]

M121243 M22452
12/5/10 5f

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

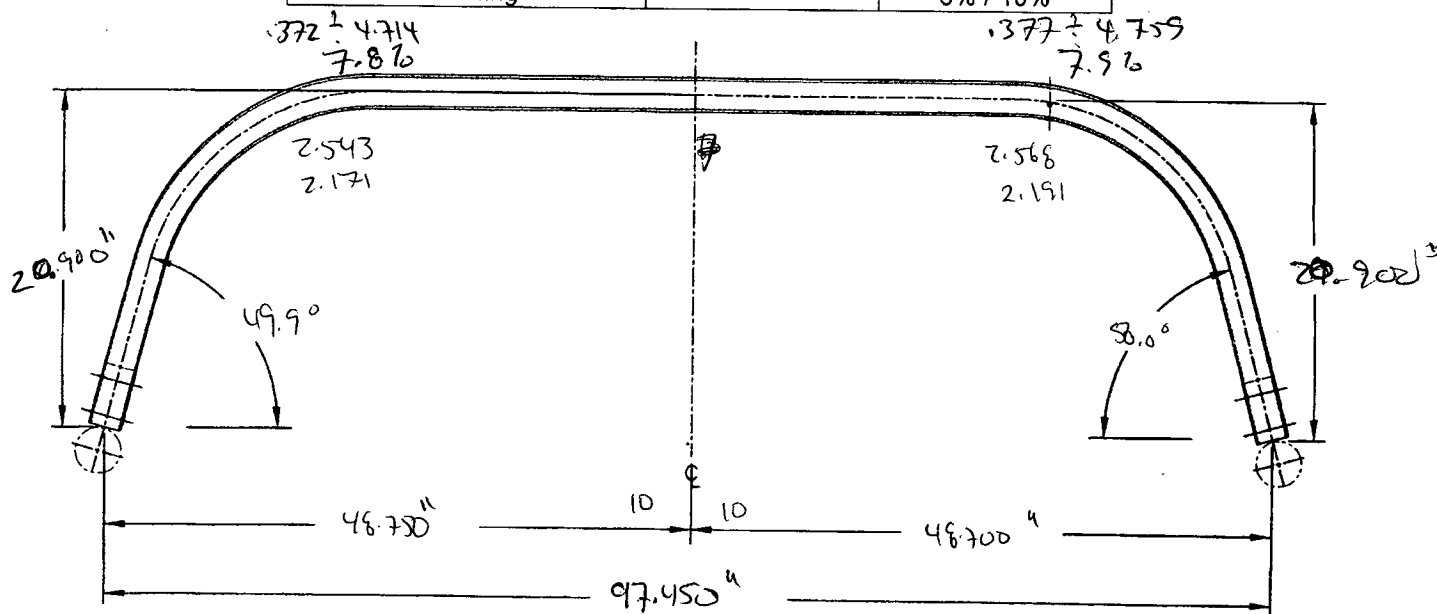
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	25877
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147 Rev: B		Page 1 of 1	

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62
Bending Passes	8	--
Crushing	--	6% / 10%



	Side A	MIDDLE	Side B
Bending Passes	(10)	(7)	(10)
Crushing	7.8%		7.9%
Comments			
Side A = 10 Passes			
Side B MIDDLE = 7 Passes			
Side B = 10 Passes			
Mark line at Bottom of Lane.			

QC15 Inspection	S
Date	12/07/10

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	
C	12.04.16	Added bending, crushing dimensions	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER LIN-D212-664)
D212-664-147B = 24.2 lbs (PER LIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. 85877 MJS

12/06/18

DEO ATTACHED

Per ECN #1164
11/07/20
UNDER REVIEW
11/08/13

RELEASED
2009-10-29

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

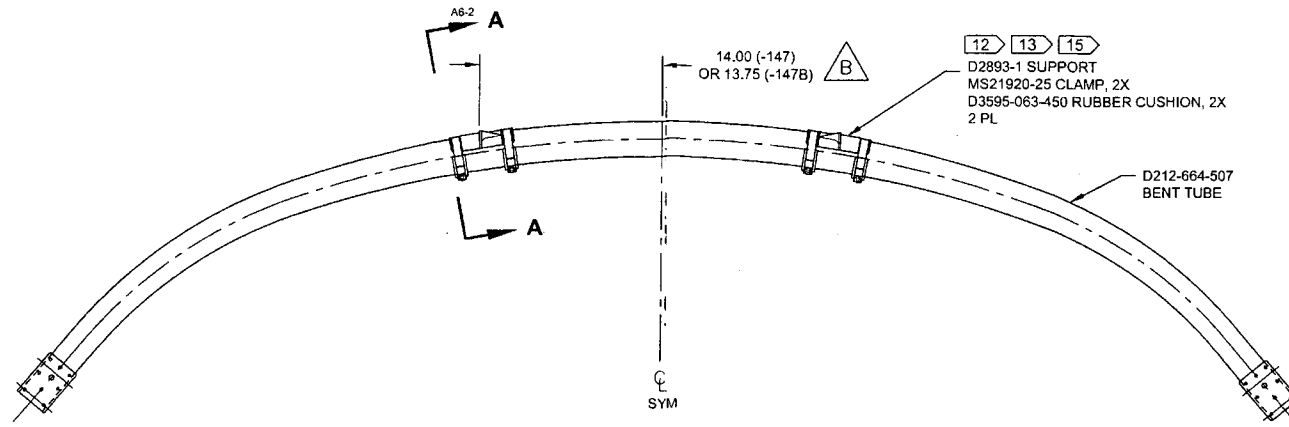
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

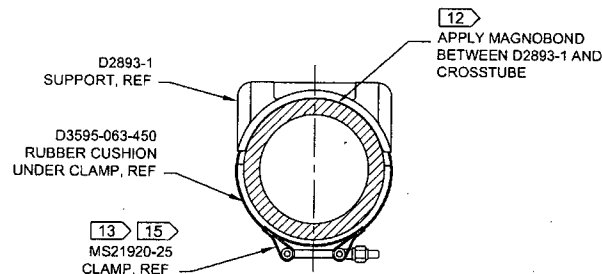
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D212-664-147/-147B
ASSEMBLY DETAIL** B



SECTION A-A D5-2
SCALE 4X

DEO ATTACHED

ECU #11-614
K.07.20
UNDER REVIEW
UP 11.06.13

RELEASED
2009-10-29

DESIGN	9P	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	9P	DRAWING NO. D212-664-147	REV. B SHEET 2 OF 4
MFG. APPR.	18	TITLE	SCALE
APPROVED	19	CROSSTUBE (205/212/412 LOW FWD)	NTS
DE APPR.	14	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	09.09.30		

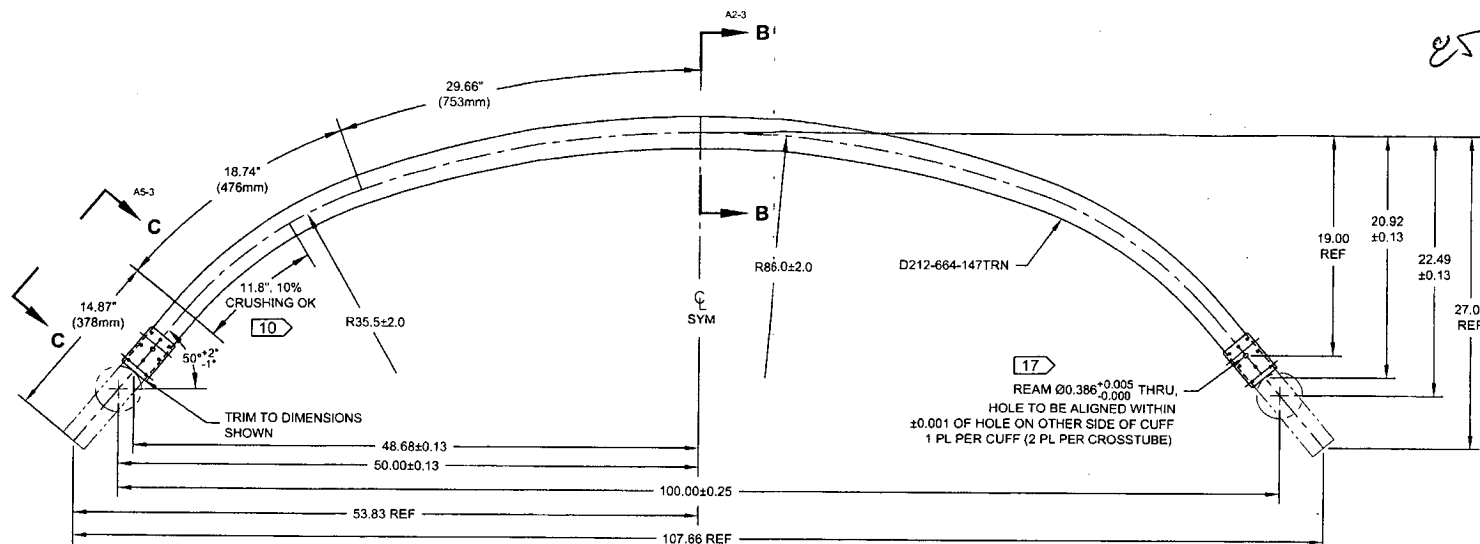
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

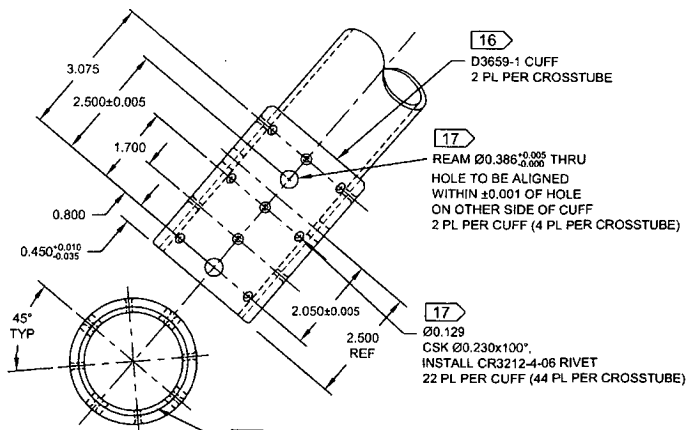
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

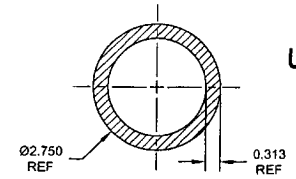
NOTE: Date & initial all entries



D212-664-507
BENDING AND DRILLING DETAIL 10 B



VIEW C-C: CUFF DETAIL D7-3
 SCALE 4X



SECTION B-B D5-3
 SCALE 4X

25877
 2011-614
 2009-09-20
 UNDER REVIEW
 09/04/13

RELEASED
 2009-10-29

DESIGN	97	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	98	DRAWING NO.	REV. B
MFG. APPR.	98	D212-664-147	SHEET 3 OF 4
APPROVED	99	TITLE	SCALE
DE APPR.	99	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

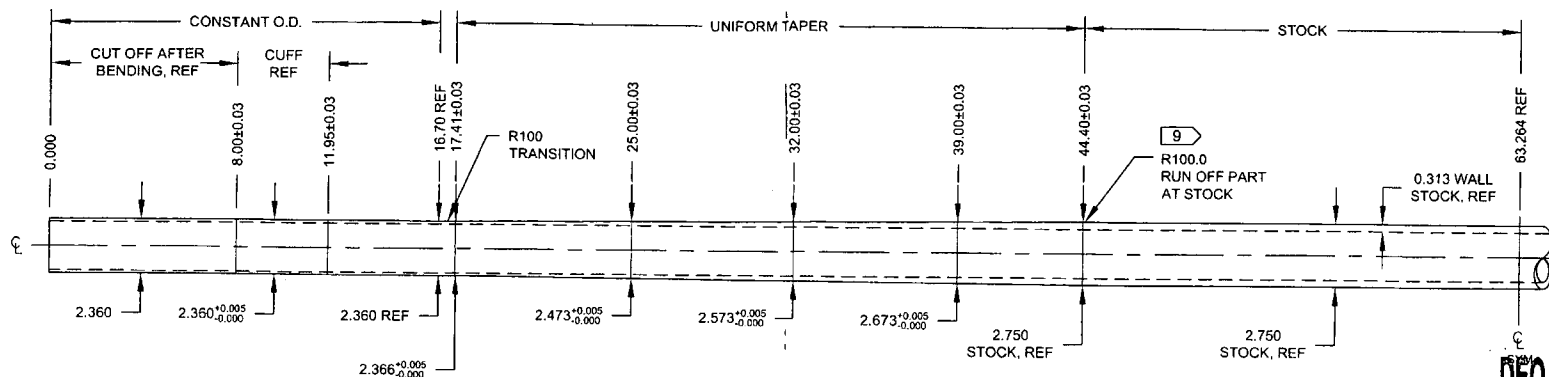
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D212-664-147TRN
TURNING DETAIL**

DEO ATTACHED

CCA #1-614

11.07.26

UNDER REVIEW

11/06/13

RELEASED

2009-10-29

DESIGN	90	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	90	DRAWING NO.	REV. B
MFG. APPR.	90	D212-664-147	SHEET 4 OF 4
APPROVED	90	TITLE	SCALE
DE APPR.	90	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DRAWING NO. D212-664-147	TITLE CROSSTUBE ASS'Y (205 LOW FWD)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-147-B-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>97</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>183</i>	APPROVED <i>MP</i>		DE APPR. <i>MP</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11.07.21		DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -147	Qty -147B	Part Number	Description
9	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
WMP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



ACUREN

LIQUID PENETRANT TEST REPORT

P- 10159

CLIENT DART AEROSPACE DATE July-12-2012 TIME AM ☒ PM ☐

ATTENTION INDA / CHANTALE ACUREN JOB NO. 188-12-00280

ADDRESS 1270 A Brixton St PO/NO NO.

HAWKES BURY, ON WORK LOCATION AS ADDRESS

PROJECT LPI WET Fluorescent on 4 CROSS-TUBES ACCEPTANCE STD. ASTM E1417S01 REV./DATE 2005

ITEM(S) EXAMINED 100% of EXTERNAL SURFACE on 4 "CROSSTUBES"

TEST DESCRIPTION PROCEDURE No. LT-002 REV./DATE 2009 TECHNIQUE No. LT-002 REV./DATE 2009

PART No. MATERIAL Alodine Aluminum THICKNESS N/A

SCOPE Performed a wet film LPI on 100% of THE EXTERNAL SURFACE on ITEMS MENTIONED

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED

AMILY BRAND MAGNAFLUOR BLACK LIGHT S/N 13798 ☒ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc

ENETRANT 2L-67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE

ENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER

DEVELOPER SKD-SS MINIMUM DWELL TIME 30 MIN. LIGHT METER S/N 1098866 CAL DUE DATE 09-28-2012

DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL

SURFACE TEMPERATURE ☐ < -4°C/20°F ☐ -4°C/20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

1 CROSS-TUBE FWD NO ID 86228 ✓

2 " " FWD NO ID 86227 ✓

3 CROSS-TUBE LWD STD FWD NO ID 85876 ✓

4 " " " " NO ID 85877 ✓

ITEM ID D212-664-101

ITEM ID D212-664-101

ITEM ID D212-664-107

ITEM ID D212-664-107

NO RELEVANT INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

Scope of Services

The agreement by Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that the descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as warranties or guarantees. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE Frank Titley PRINT SIGNATURE

TECHNICIAN (SIGNATURE): VES DESROCHES PRINT SIGNATURE

NAME (PRINT): VES DESROCHES 1ST TECHNICIAN 2ND TECHNICIAN

CGSB LEVEL 2 SNT LEVEL 2 CGSB LEVEL — SNT LEVEL —

CGSB REG. No. 3044 CGSB REG. No. —

DTR # 685111

REPORT REVIEWED BY: NAME INITIALS



LIQUID PENETRANT TEST REPORT

P- 12202

PAGE 1 OF 1

CLIENT DART Aerospace DATE Jul 14 2012 TIME AM ☒ PM ☐
ATTENTION ANDY / LINDA ACUREN JOB NO. 188-12-C0285
ADDRESS 1270 ABERDEEN ST. PO/VO NO. -
HAWKESBURY, ON WORK LOCATION SAVE
ACCEPTANCE STD. ASTM 1417/051 REV./DATE 2005
PROJECT F.P.I. on cross tubes
ITEM(S) EXAMINED 11 - PCS

JOB DESCRIPTION PROCEDURE NO. LT002 REV./DATE 2008 TECHNIQUE NO. LT002 REV./DATE 2008
PART NO. SEE RESULTS MATERIAL ALUMINUM THICKNESS VARIABLES
SCOPE A WET FLOUORESCENT LIQUID PENETRANT EXAMINATION
WAS COMPLETED ON THE EXTERNAL SURFACE 100%

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 10459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT 2607 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE Jul 17, 2012
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ☒ METRIC ☐ IMPERIAL

<u>CROSS TUBE - O.</u>			
<u>1</u>	<u>85877</u>	<u>✓</u>	
<u>1</u>	<u>86693</u>	<u>✓</u>	
<u>1</u>	<u>86692</u>	<u>✓</u>	
<u>1</u>	<u>84764</u>	<u>✓</u>	
<u>1</u>	<u>86132</u>	<u>✓</u>	
<u>1</u>	<u>87329</u>	<u>✓</u>	
<u>1</u>	<u>87328</u>	<u>✓</u>	
<u>1</u>	<u>85315</u>	<u>✓</u>	
<u>1</u>	<u>85316</u>	<u>✓</u>	
<u>1</u>	<u>85317</u>	<u>✓</u>	
<u>1</u>	<u>85318</u>	<u>✓</u>	

ENGINEERING REQUEST - NCR
WAS ORIGINALLY NOT ON JUL 12/2012
REF: P-10159

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of information or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE Andy Sheldon PRINT AS SIGNATURE
TECHNICIAN (SIGNATURE): [Signature]
NAME (PRINT): Mike Sheldon 1ST TECHNICIAN
CGSB LEVEL # SNT LEVEL # CGSB LEVEL # SNT LEVEL #
CGSB REG. NO. 6606 CGSB REG. NO. 6606
DTR # E117389
REPORT REVIEWED BY: [Signature]
NAME INITIALS

REFERENCE ONLY

DART AEROSPACE LTD.

IIN-D212-664

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5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AAI SKIDTUBES.

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